Before the
FEDERAL COMMUNICATIONS COMMISSION
Washington, DC 20554

In the Matter of:

Carrier Current Systems, including Broadband over Power Line Systems	**)** **)** **)**	**ET Docket No. 03-104**
Amendment of Part 15 regarding new requirements and measurement guidelines for Access Broadband over Power Line Systems	**)** **)** **)**	**ET Docket No. 04-37**

To: The Commission

REPLY COMMENTS OF THE RADIO AMATEUR SATELLITE CORPORATION

The Radio Amateur Satellite Corporation (AMSAT) hereby respectfully submits these Reply Comments to certain Comments filed in response to the *Notice of Proposed Rule Making* (the Notice), FCC 04-29, released February 23, 2004, 69 Fed. Reg. 12612 *et seq*.

1. AMSAT filed Comments in response to the Notice, as well as Comments and Reply Comments in response to the *Notice of Inquiry*, ET Docket No. 03-104, FCC 03-100, 68 Fed. Reg. 28182, released April 28, 2003 and corrected May 23, 2003 at 68 Fed. Reg. 32720.

2. Measurements taken at existing Access BPL test sites and provided to the Commission have clearly demonstrated that the emissions at those sites are strong enough to cause severe and harmful interference to amateur stations, as well as others using the HF spectrum under conditions similar to those encountered by amateurs. This interference is not limited to specific times and spot frequencies, but is steady and pervasive throughout the amateur bands and presumably throughout the entire HF spectrum. AMSAT points especially to Comments filed by Carl R. Stevenson (Stevenson) and ARRL, the National Association for Amateur Radio (ARRL). Stevenson is a recognized authority in this field, and his Comments

contain specific test results, not conjecture as many Access BPL proponents characterize the interference concerns of thousands of amateurs and others who have pointed out the pitfalls of adopting this flawed technology. Furthermore, those promoting Access BPL provide NO test data – merely assurances that any interference will be taken care of. These are particularly unsupported claims in light of the abysmal record of power companies in dealing with unintentional noise from their lines. In a number of instances in recent years, the Commission has been called upon to take action in this regard. Imagine the load the Commission will face with thousands of harmful interference complaints from amateurs and others pouring in every week as a result of Access BPL operation. Even low levels of high-frequency radiation can cause interference hundreds of miles away from the source and may seriously effect communications in adjacent countries of Canada and Mexico. Under good ionospheric propagation conditions, such interference may easily be heard around the world, and in any case would be a violation of our international agreements under the International Telecommunication Union (ITU).

3. The additional workload the Commission will face is only a part of the expense associated with Access BPL, expense that will be borne by other than Access BPL operators. AMSAT wishes to point out one very good treatise on this subject provided in Comments on this proceeding by Mr. Robert B. Famiglio of Media, Pennsylvania. Mr. Famiglio's paper notes that a portion of the economies which accrue to the operators of Access BPL result from the fact that some of the expenses associated with such operation are not borne by those operators but by others who must expend funds in order to overcome the effects of Access BPL. One example of this might be amateurs who may have to acquire high power amplifiers in order to communicate in the face of BPL interference when they have been operating for years without benefit of such

amplifiers. If only ten thousand amateurs must expend Three Thousand Dollars each for an amplifier, that totals THIRTY MILLION DOLLARS, an out-of-pocket cost which no Access BPL operator will see. AMSAT is certain that there are other examples not associated with amateur radio operators.

4. Despite this evidence to the contrary, some pro-BPL commenters such as Progress Energy (Progress) claim that "the interference potential of Access BPL is marginal[1]." Progress admits that it has "received several complaints of alleged 'harmful interference' from amateur radio operators (hams)[2]," but dismisses them, claiming, according to Progress, "those who have submitted complaints about Progress Energy's BPL system intentionally seek out interference using very sophisticated and sensitive equipment." AMSAT points out that measurements should always be accomplished using the best available technology. Anything else will not yield valid results, which seems to be what Progress wishes – to obtain whatever results support its contention that Access BPL does not cause interference. Several documented tests have PROVED otherwise. AMSAT cannot believe that the Commission, the historic guardian of the radio spectrum, can proceed with a technology which has been PROVEN to be detrimental to HF communications, based ONLY on claims from proponents that little or no "harmful" interference will result, especially when they don't back up their claims with any sort of proof.

5. Admission that Access BPL does cause interference is provided by Ambient Corporation (Ambient), a manufacturer of Access BPL systems. Ambient claims that "under the Commission's policies, 'a certain amount of interference between devices is acceptable; however, beyond a certain limit interference can be considered harmful [footnote omitted]'. Ambient requests that the Commission set the boundaries for what is considered harmful

[1] ¶6, at 5.

[2] ¶7, at 8.

interference so that there is a realistic opportunity for the early deployment of BPL technologies…[3]" In other words, Ambient is asking the Commission to define away the problem, i.e., to define "harmful interference" in such a way as to enable Access BPL to be deployed rapidly. The only support cited by Ambient for this position, in the aforementioned omitted footnote, is a staff working paper[4] which, as such, has no legal significance whatsoever. In any event, "harmful interference" is already defined in the ITU Radio Regulations as "interference which endangers the functioning of a radionavigation service or seriously degrades, obstructs, or repeatedly interrupts a radiocommunication service operating in accordance with these Radio Regulations.[5]" This definition is repeated at various places in the Commission's Rules, including 47 C.F.R. §15.3(m) and 47 CFR §97.3(a)(23). Not only is another definition unnecessary, but the Radio Regulations themselves prohibit the Commission from adopting or applying any definition of harmful interference not consistent with this international treaty language to which the United States is a signatory. What matters under this definition is not the strength or power flux density of the interfering signal, but its effect.

6. As ARRL's legal analysis, presented in this proceeding demonstrates, licensed services such as amateur radio are entitled under the Communications Act and, in the case of international communication, the Radio Regulations, to absolute protection from harmful interference caused by Part 15 devices such as Access BPL systems, while such systems must accept any interference they may receive from licensed stations operating in accordance with the Table of Frequency Allocations. AMSAT contends that the Commission has no statutory authority to create exceptions that require licensed stations to "tolerate a certain amount" of

[3] Ambient Comments, at 4.

[4] OSP Working Paper Series, "Unlicensed and Unshacked: A Joint OSP-OET White Paper on Unlicensed Devices and Their Regulatory Issues," May 2003, pp. 45-46.

[5] CS 1003, RR 1.169.

harmful interference from Part 15 devices, or to take measures to accommodate such interference. In fact, AMSAT submits that the Commission will be derelict in its duty if it does create such exception in order to accommodate Access BPL.

7. Various Comments in response to the Notice, including those of ARRL, Stevenson, Potomac Valley Radio Club (PVRC) and others, pointed out that the adaptive features of Access BPL technology, cited by Progress as a way of mitigating interference, offer NO meaningful protection to amateur radio, since the BPL system has no way of knowing the frequency to which an amateur station is listening. The only feasible way of providing such protection, short of prohibiting Access BPL altogether as some foreign countries have found it necessary to do, is to require Access BPL systems to notch out all amateur bands, and to adopt adequate technical standards for doing so, consistent with the Radio Regulations. This would also benefit the Access BPL industry as it would eliminate most occurrences of reports of interference to Access BPL system from amateur stations. It would also relieve the Commission's burden with respect to dealing with interference complaints both from and to Access BPL systems. PowerWAN, Inc. (PowerWAN), another manufacturer of Access BPL systems, notes that its technology already notches out the amateur bands. However, AMSAT reminds the Commission that several non-amateur organizations commenting; including Boeing, Aeronautical Radio, Inc. (ARINC), the Association of Maximum Service Television (MSTV), the Society of Amateur Radio Astronomers (SARA), Ship Com, LLC, even NTIA, have urged that Access BPL not be allowed to use their particular portions of the spectrum. Other entities including the Association of Public Safety Communications Officials-International Inc. (APCO) and the Missouri State Highway Patrol, plead for the "not in our backyard" approach. With so many holes in its usable spectrum, can Access BPL function? Beyond that, can the Commission ignore all of these

licensed users of the radio frequency spectrum, which provide vital services to the Nation, and simply plunge ahead with Access BPL anyway? Even FEMA, now part of the Department of Homeland Security, has written Chairman Powell stating, "We have become aware that certain distinct approaches to BPL may have the potential to cause interference to FEMA's high frequency radio emergency communications system."

8. Access BPL is almost certain to have impact beyond the frequencies it actually utilizes. This is true because of two phenomena implicit in radio. One of these is the generation of energy at frequencies which are both even and odd multiples of the frequencies intentionally generated (harmonics). Another is mixing products. These are generated by combinations of two or more RF carriers being present in a nonlinear medium, which produces sum and difference frequencies. Mixing products can cause interference when two or more signals meet in a nonlinear medium such as a corroded joint in a power line. In the case of Access BPL, this can cause the various carriers involved to produce many spurious frequencies which are sums and differences of themselves. Thus, these spurious signals can be both above and below the range of frequencies used by the Access BPL system. The ones above, along with the harmonics, will appear at VHF and higher frequencies. Moreover, being higher in frequency (shorter in wavelength), they will radiate more readily from the power lines carrying them than will the fundamental frequencies actually being used by the Access BPL system. Both harmonic generation and signal mixing are fundamental to radio and have been know since the earliest days of the art. It is amazing to AMSAT that none of the Access BPL proponents nor the Commission have addressed this well known fact of radio life. It was pointed out in initial Comments by AMSAT and William A. Tynan (Tynan), as well as several others. They noted that merely notching out amateur frequencies will not be sufficient to handle problems created by

out-of-band signals produced by harmonics and/or mixing. In addition to the amateur bands, including those used for amateur satellite downlinks, such out-of-band signals from Access BPL can affect many other types of amateur communication at VHF and UHF and various emergency services such as police and fire, as well as safety-of-life aircraft communication. AMSAT contends that further technical investigation of this issue is needed before Access BPL is authorized.

9. The National Telecommunications and Information Administration (NTIA) submitted Comments dated June 4 which included a lengthy (11 MB) technical appendix, which AMSAT has not yet had sufficient time to review. We therefore reserve the right to submit an additional, late-filed comment in response to NTIA, which we trust the Commission will consider.

For the reasons stated, AMSAT urges the Commission to give a great deal more thought to this matter before proceeding with authorization of Access BPL. Further, it is hoped that President Bush will be briefed on ALL facts, both pro and con, so that he can make an informed decision on whether or not he wishes to continue to support the deployment of Access BPL technology.

RESPECTFULLY SUBMITTED,

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June 22, 2004